

CHAPTER 3

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment and environmental consequences associated with each alternative. The intent is to provide a consistent, analytical basis for comparison of the alternatives and the impacts that would result from implementation of these alternatives. First, the methodology for conducting the analysis is described. Then, the results of the analysis are presented by impact topic, as identified in Section 1.5.1. Consistent with NEPA, the analysis considers the duration, intensity, type, and context of direct impacts; indirect impacts; cumulative impacts; and measures to mitigate impacts.

3.1 METHODOLOGY

3.1.1 Conducting the General Evaluation

The analysis of each impact topic includes a brief discussion of the regulations and policies applicable to the resource, a description of the affected environment, and an evaluation of the impacts of implementing each alternative. The impact analyses were based on information provided by NPS staff, relevant references and technical literature, and subject matter experts. The impact analyses involved the following steps:

- Define issues of concern based on Project planning and scoping.
- Identify the geographic area that could be affected.
- Define the resources within the area that could be affected.
- Impose the action on the resources within the Project area.
- Identify and quantify, to the extent possible, impacts caused by the alternative, in comparison to the baseline represented by the No Action Alternative, to determine the relative change in resource conditions.
- Characterize the impacts based on the following factors:
 - Duration of the impact: short-term or long-term.
 - Intensity of the impact: negligible, minor, moderate, or major.
 - Type of impact: beneficial or adverse.
 - Context or area affected by the impact: local (within the Project area and immediate vicinity), throughout Theodore Roosevelt National Park North Unit, or regional (extending beyond Theodore Roosevelt National Park North Unit boundaries).

- Determine whether the impact would be a direct result of the Project or would occur indirectly because of a change to another resource or impact topic. An example of an indirect impact would be increased mortality of an aquatic species that would occur because an alternative would increase soil erosion, which would reduce water quality.
- Determine cumulative impacts by evaluating the impacts of the Project in conjunction with the impacts of past, present, and reasonably foreseeable future projects in Theodore Roosevelt National Park and the region.
- Determine what resource protection measures (see Section 2.3 and Appendix B) should be implemented to minimize impacts.

The area predicted to be disturbed for each alternative is an objective measure for comparing resource impacts. Whereas the footprint of the facility would be the same for each alternative, approximately 4,700 square feet, the amount of site development would vary for each alternative. Consequently, Table 2 is included to compare land disturbance, including the approximate acres of land to be graded, and to describe key features of each area. Because site design is at a conceptual stage, with specific site details unknown, the estimated land disturbance acreage was rounded up to the nearest 0.5 acre.

Table 2
Area Affected by Alternative

Alternative	Acreage*	Area Description Summary
Build Alternative 1	1	A relatively flat site is approximately 120 feet** southeast of the Abandoned Visitor Center and previously disturbed by construction of the Abandoned Visitor Center. The site is maintained as closely mowed vegetation. Build Alternative 1 would result in approximately 0.2 acre of new impermeable surfaces (building, walkways, and access road).
Build Alternative 2	2	A moderately sloped site is approximately 250 feet** northwest of the Abandoned Visitor Center and is natural grassland. The south side of the site is a maximum of 15 feet above the elevation of Scenic Drive; the north side is approximately 30 feet above the elevation of Scenic Drive. Build Alternative 2 would result in approximately 0.4 acre of impermeable surfaces (building, walkways, parking, and access road).
Build Alternative 3	2	A gently to moderately sloped site is approximately 240 feet** southwest of the Abandoned Visitor Center, across Scenic Drive. A small portion of this site is developed land; the remainder is introduced and natural grassland. Build Alternative 3 would result in approximately 0.4 acre of impermeable surfaces (building, walkways, parking, and access road).
Build Alternative 4	3	A gently sloped site is approximately 700** feet west of, and lower in elevation, than the Abandoned Visitor Center. The site is mostly disturbed grassland, but includes a small woodland. Build Alternative 4 would result in approximately 0.8 acre of impermeable surfaces (building, walkways, parking, and access road).

Note:

* The acreage includes the area of the construction footprint and demolition of the Abandoned Visitor Center (for each alternative) and the parking lot (full demolition for Build Alternative 3 and partial demolition for Build Alternatives 2 and 4).

** Indicates the approximate distance from center of the Abandoned Visitor Center to the center of the potential area identified for siting a new building.

3.1.2 Assessing Cumulative Impacts

CEQ's Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508) require assessment of cumulative impacts in the decision-making process for Federal projects. A cumulative impact is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). Reasonably foreseeable future actions are those that are not speculative, are likely to occur based on reliable sources, and are typically characterized in planning documents. Therefore, cumulative impacts are considered for both the No Action Alternative and the Build Alternatives.

Cumulative impacts were assessed by considering the impacts of the alternatives for this Project in addition to impacts associated with other past, present, and reasonably foreseeable future actions. To support this analysis, information was gathered on ongoing and future actions by the NPS and other agencies. Because some of the projects are in an early planning phase, the evaluation of cumulative effects is qualitative.

3.2 GEOLOGICAL RESOURCES

3.2.1 Affected Environment

Geologic resources include soils, bedrock, and streambeds. Along with climate, the geologic setting determines the behavior and characteristics of a landscape: the stability of the hillsides, the physical and chemical properties of the soil, the availability of water, and the type of plants that will grow. The Little Missouri River Badlands form the scenic setting of Theodore Roosevelt National Park North Unit. These badlands were formed, and continue to be re-formed, by the ongoing water and wind erosion of sedimentary rocks (that is, sandstone, siltstone, and claystone) formed from deposits of sand, silt, mud, and layers of volcanic ash. Seams of lignite coal¹ are also present in many areas of these badlands. These coal seams formed from dying and decaying trees and other plants in prehistoric swamps. When streams in the area changed course, they buried partially decomposed vegetation (peat) beneath layers of silt and clay. Over time, the weight of the overlying sediment compressed the peat to lignite coal (Blueemle, n.d.). The lignite coal is present in the Sentinel Butte Formation and in sediments eroded from the Sentinel Butte Formation. This lignite has a high moisture content (NPS, June 2007). Lignite is porous and acts as a pathway for water to seep into soils, increasing soil moisture.

NPS *Natural Resource Management Reference Manual* #77 includes general management guidance for geologic, soil, and water resources. NPS policies support the preservation of geologic resources from the adverse effects of human activity, while allowing natural processes to continue; preserve the soil resources of parks and prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil, or its contamination of other resources; and maintain water in its natural condition, free of pollutants generated by human activity (NPS, February 5, 2004).

¹ Lignite coal is typically brown in color and forms from decaying organic material at shallow depths and temperatures lower than 100 °C.

Geologically, Build Alternatives 1, 2, and 3 are located in an area mapped as Quaternary² landslides, which is comprised of unconsolidated soil and rock material (clay, silt, sand, and gravel) derived from local sediment transported by gravity (slump, earth flow, rockslides, and creep) to hillsides and valley floors. These areas are subject to active movement (USGS, December 2007; NPS, April 28, 2010). While most of the site where Build Alternative 2 would be constructed is also located in the area mapped as Quaternary landslides, approximately 0.1 acre of the site is located in an area mapped by NPS as Quaternary modern alluvium, which is made up of alluvium and stream deposits of sand, silt, and gravel. Most of the area along Scenic Drive east of the designated wilderness is mapped as Quaternary landslides. The Quaternary landslides are made up of weathered material from the Sentinel Butte formation, which is approximately 0.3 mile north of the Build Alternative sites (NPS, April 28, 2010). Build Alternative 4 is located in an area mapped as Quaternary older alluvium, consisting of deposits of sand, silt, clay, and gravel. These areas are distinguished by steep vertical erosion scarps (a linear steep face or slope) (NPS, April 28, 2010). Build Alternative 4 is located between two intermittent streams; both of these streams are bounded by steep erosion scarps.

Various layers of siltstone, claystone, and sandstone bedrock underlie the Quaternary landslides and older alluvium in the area of the Build Alternatives, including alluvial fans and terraces of highly variable materials (ranging from sand and gravel to clay and mud). Thin layers of lignite coal are common throughout this area (NPS, June 3, 1987; NPS, June 2007). In a test hole drilled by the North Dakota State Water Commission, located approximately 660 feet east-southeast of the Abandoned Visitor Center, bedrock (siltstone) was observed at a depth of 96 feet. Layers of clay with silt were observed from 1 foot below the ground surface to a depth of 65 feet. Lignite was observed at a depth of 66 to 68 feet. Lignitic gravel was observed at a depth of 56 to 62 feet in an observation well located approximately 1,560 feet southeast of the Abandoned Visitor Center. Bedrock was observed at a depth of 153 feet in this observation well. Gravel with 60 to 80 percent lignite was observed at a depth of 29 to 102 feet in an observation well approximately 3,600 feet southeast of the Abandoned Visitor Center. Bedrock was observed at a depth of 127 feet in this observation well (North Dakota State Water Commission, n.d.; North Dakota GIS Hub Data Portal, June 27, 2014).

Build Alternatives 1, 2, and 4 and most of Build Alternative 3 are located in NRCS-mapped Cabbart-Kremlin-Boxwell loam soils that formed in weathered siltstone and mudstone. The remaining approximately 0.2 acre of Build Alternative 3 is located in NRCS-mapped Patent loam soil that formed in fine loamy alluvium (materials deposited by streams) on bottom slopes of alluvial fans (Natural Resources Conservation District [NRCS], February 12, 2014). Neither the Cabbart-Kremlin-Boxwell loam nor the Patent loam are hydric soils (one of three potential indicators of wetlands) (NRCS, February 12, 2014). Properties of these soils are summarized in Table 3.

² Quaternary landslides are landslides that have occurred within the last 2.6 million years, within the geologic time period referred to as the Quaternary Period.

Table 3
Properties of Affected Soils

Soil Property ¹	Cabbart-Kremlin-Boxwell loam, 9 to 40 percent slopes, slumped	Patent loam, 0 to 6 percent slopes, occasionally flooded
Depth to bedrock	10 to 20 inches	Greater than 60 inches
Drainage	Well drained	Well drained
Depth to water table ²	Greater than 80 inches	Greater than 80 inches
Flooding	None	Occasional
Building site development ⁴	Very limited: <ul style="list-style-type: none"> • Steep slopes • Moderate shrink-swell potential³ • Shallow bedrock 	Very limited: <ul style="list-style-type: none"> • Flooding • Moderate shrink-swell potential³
Erosion hazard	Wind – low, Water - moderate	Wind – moderate, Water - moderate

Source: NRCS, February 12, 2014.

Notes:

¹ These soil properties are not site-specific, but are typical for the soil.

² The water table is the depth at which soils are saturated with water.

³ The shrink-swell potential is the extent to which soils expand when wet and shrink when dry.

⁴ The majority of the park has very limited potential for building site development. The characteristics that provide the park with scenic geologic features also require special design and construction techniques to support construction.

The soils in the North Unit of the park, including all four Build Alternative sites, are expansive when wet. Subsurface clays and silt that are also expansive, so constructing buildings on these sites requires measures to overcome potential movement of or damage to buildings. A deep foundation and pier system, grade beams, and a structural floor would be used to mitigate the effects of expansive surface and subsurface materials. Site grading to drain water away from buildings lessens the amount of groundwater in these expansive soils, reducing the potential for these soils to expand.

The Build Alternative 1 site is nearly flat. The site rises approximately 5 feet from south to north over a distance of 135 feet (an approximately 4 percent slope). The southern edge of this site is at the same elevation as Scenic Drive. The slope to the north of the site rises approximately 10 feet over a distance of 80 feet (an approximately 13 percent slope). The slope to the east of this site is similar to the slope north of the site and nearly flat to the west.

Most of Build Alternative 2 site rises up steeply from Scenic Drive. With the exception of the western end of the Build Alternative 2 site, the existing land rises up steeply from Scenic Drive and the Abandoned Visitor Center. Near the southern end of the site, the elevation change is approximately 15 feet over a distance of approximately 60 feet (an approximately 25 percent slope), then another 10 feet over a distance of 65 feet (an approximately 15 percent slope). Near the middle of the site, slopes are less steep and the elevation difference is not as great. Slopes steepen again near the northwest end of the site, where the Build Alternative 2 site partially extends into an intermittent stream valley. The intermittent stream, flowing from north to south, has cut a steep valley west

of the Build Alternative 2 site. The Build Alternative 2 site is approximately 10 to 30 feet above the elevation of Scenic Drive.

The Build Alternative 3 site rises approximately 15 feet from west to east over a distance of approximately 170 feet (an approximately 9 percent slope). Most of this site is approximately 5 to 15 feet below the elevation of Scenic Drive. Slopes steepen substantially as erosion scarps in the intermittent stream valley just west of this site.

The Build Alternative 4 site slopes gently to the south from the Scenic Drive. The proposed access road would meet Scenic Drive at or near grade. The decrease in elevation from north to south is approximately 36 feet over a length of approximately 600 feet (an approximately 6 percent slope). The east-west slope, at approximately the point of the proposed visitor center, is more gradual at just 1 percent (a 3-foot increase). Slopes (erosion scarps) steepen substantially adjacent to and within the intermittent stream valleys to the west, east, and south of this site.

3.2.2 Impacts of No Action Alternative

Under the No Action Alternative, geologic site conditions would continue to change and result in a moderate (noticeable) impact on geological resources until the Abandoned Visitor Center could be demolished, fill added, and the site restored. Until then, the slope to the north of the building would continue to slump and would be noticeable, further affecting the stability of the Abandoned Visitor Center and adjacent land. The use of trailers as a temporary visitor center would require connections to utilities already on-site, with no additional subsurface impacts expected. The short-term and long-term moderate adverse local impacts would continue, worsening site stability conditions.

In summary, there would be a short- and potentially long-term moderate adverse local impact from continuing deterioration of Abandoned Visitor Center site caused by slumping and instability of ground. Once demolished, fill added, and the site restored, some adverse long-term impacts could effectively be mitigated to minor.

3.2.3 Impacts of Build Alternative 1

The site is nearly level, and slopes around the site are less than half as steep as the site of the Abandoned Visitor Center. Additionally, the site is farther away (90 feet as compared to 25 feet) from the hill behind the Abandoned Visitor Center. Consequently, the risk of landslide or slumping of soil at the Build Alternative 1 site is less than the site of the Abandoned Visitor Center. Demolition of the Abandoned Visitor Center would include removing the topside structure and retaining most of the basement floor and four basement walls to enhance area site stability. Holes would be drilled in the walls to allow flow of groundwater, fill material would be placed in the basement, and the site would be graded and leveled.

To mitigate for the expansive soils, coal seams, surface drainage, and groundwater conditions, the new visitor center would not have a basement and would be constructed with a deep foundation system including deeper piers; as discussed in Chapter 2, Alternatives, with an example of a deep foundation and pier system shown in Figure 11. Appendix B notes this mitigation measure. The piers would extend down to a layer of sufficient strength and stability; the depth of the piers would be determined during the design process. The new visitor center would be constructed to drain surface water away

from the facility. The lack of a basement, the use of piers to support the foundation, and grading to drain water away from the proposed building would better protect the structure from subsurface water impacts that occurred with the Abandoned Visitor Center.

The site would require little grading, as the site is nearly level and essentially the same elevation as Scenic Drive. Fill material would be needed to fill the void of the basement of the Abandoned Visitor Center and for leveling the site. The foundation and walls of the current basement could possibly be retained to provide stabilization protection. In addition to the demolition of the Abandoned Visitor Center (approximately 0.2 acre of disturbance), site construction would disturb approximately 0.5 acre of soil within an approximate 1-acre alternative footprint area. The existing parking lot would be reused, allowing the construction footprint to be smaller than that of the other Build Alternatives. The disturbance footprint would total approximately 1 acre to account for maneuverability of construction equipment and potential minor adjustments in the design. The soil at this site is rated by USDA-NRCS as having a low susceptibility to wind erosion and a moderate susceptibility to water erosion. Erosion during construction would occur and has the potential to contribute to sedimentation of the intermittent stream to the west and southwest. Using BMPs (for example, EPA rules on stormwater discharges on construction sites), National Pollutant Discharge Elimination System (NPDES) requirements, and those in accordance with *Natural Resource Management Reference Manual #77* (NPS, February 5, 2004), and Clean Water Act requirements, erosion control measures would be implemented to protect soil and water resources. Erosion control measures could include silt fences placed at the limits of grading. Any fill material would be clean from hazardous materials, appropriate for use as construction fill, and weed free to the extent practical in accordance with *Natural Resource Management Reference Manual #77* (NPS, February 5, 2004).

Short-term impacts on geologic resources during the approximately 1-year construction period would be adverse and localized within the construction footprint and would be minor (temporary and barely affecting adjacent streams or existing vegetation outside of the construction footprint). The ground in the vicinity of the Abandoned Visitor Center and the proposed visitor center would still be unstable; however, constructing the proposed visitor center with a deep foundation and pier system would minimize the effect of the unstable soil on the proposed visitor center structure.

Long-term impacts on geologic resources would be minor, adverse, and localized because the site and the new visitor center would be protected with the design of the facility described above. Final grading and revegetation of the site would return surface erosion to pre-construction levels, conforming to NPDES permit conditions and NPS policies. No indirect effects are anticipated on geologic resources.

In summary, there would be a short-term minor adverse local impact from construction (site grading and demolition of Abandoned Visitor Center), and long-term minor adverse local impact due to site stability and restoration of land cover. The deep foundation and pier system is expected to protect against structural damage.

3.2.4 Impacts of Build Alternative 2

Construction of a visitor center at the Build Alternative 2 site would present greater engineering challenges related to geologic resources than Build Alternative 1 because the

site has greater topographic relief. Construction at this site would require substantial excavation and grading to establish a level site at an elevation consistent with Scenic Drive. Grading and excavation is also necessary to meet requirements of the ADA and NPS policies regarding access for all visitors (further discussed in Section 3.4).

The site could be situated on the hillside and would require grading to level the site area. A deep foundation system with deeper piers would be needed to stabilize the proposed visitor center structure as discussed in Chapter Two. Fill material could be needed. Alternatively, the site could be closer to the current site of the Abandoned Visitor Center and would require excavation and grading to modify the site to the approximate elevation of Scenic Drive. Placing the site near Scenic Drive would create a steep slope to the north of the construction site that would need to be stabilized with a retaining wall or similar structure. This slope would present a situation similar to the Abandoned Visitor Center with an unstable slope prone to movement due to water flow from the upland Sentinel Butte formation to the north.

As discussed in Chapter 2, locating the visitor center at Alternative Site 2 would require constructing an access road and parking lot. Construction at this site would require a total footprint of approximately 2 acres (1.5 acres within an approximate 2-acre alternative footprint area to construct the facility and parking lot, 0.2 acre to demolish the Abandoned Visitor Center, and approximately 0.4 acre of existing parking lot demolition). This would be larger than Build Alternative 1 (1 acre), would have a similar footprint as Build Alternative 3 (2 acres), and would have a smaller footprint than Build Alternative 4 (3 acres). Consequently, a larger area would be exposed to erosion compared to Build Alternative 1, and less area would be prone to erosion compared to Build Alternative 4.

The site is confined by the intermittent stream valley and gullies to the west and south and by Scenic Drive. Based on the presence of coal seams throughout the area, and the observance of coal seams in the hill behind the Abandoned Visitor Center, coal seams are likely present beneath the site. Build alternatives would utilize a deep foundation and pier system, and example of which is shown in Figure 11. The new visitor center would be constructed to drain surface water away from the facility. The lack of a basement, the use of piers to support the foundation, and grading to drain water away from the proposed building would protect the structure from subsurface water impacts that occurred with the Abandoned Visitor Center.

Build Alternative 2 is susceptible to greater levels of soil erosion than the other Build Alternatives due to steeper slopes, more extensive earth moving activities, and closer proximity to the unnamed intermittent stream. Consequently, more robust erosion control measures would be required; consequently, this alternative would have a greater potential for future instability problems compared to the other build alternatives. An NPDES permit would be acquired, and measures for erosion control would be identified and implemented. Any fill material would be clean from hazardous materials, appropriate for use as construction fill, and weed free to the extent practical in accordance with *Natural Resource Management Reference Manual #77* (NPS, February 5, 2004).

During the approximately 1-year construction period, short-term adverse impacts on geologic resources, such as soil disturbance and erosion, would be localized within the construction footprint and would be minor (temporary and barely affecting adjacent streams or existing vegetation outside of the construction footprint) to moderate (detectable siltation and changes to soil properties, but limited impacts could be successfully mitigated under the NPDES permit). Short-term adverse local impacts on geological resources would be minor if the visitor center were constructed on the hill, but moderate if the site were excavated and the visitor center constructed at a similar elevation as Scenic Drive.

Long-term impacts on geologic resources would be minor, adverse, and localized if the new visitor center were constructed on the hill because the site and the new visitor center would be stable with the design of the facility described above. Long-term impacts on geologic resources would be moderate, adverse, and localized if the visitor center were constructed at a similar elevation as Scenic Drive due to the potential instability of the slope and retaining wall necessary for this option. Final grading and revegetation of the site would return erosion to pre-construction levels, conforming to NPDES permit conditions and NPS policies on restoration of altered sites to a more natural appearance. No indirect effects are anticipated on geologic resources.

In summary, there would be a short-term minor to moderate adverse local impact from construction (site grading and demolition of Abandoned Visitor Center and most of existing parking lot) depending on location of facilities within the site (on hill or level with Scenic Drive with retaining wall). There would be a long-term minor adverse local impact due to site stability and restoration of land cover if the facility were constructed on a hill, and a long-term moderate adverse local impact if it were constructed level with Scenic Drive and with a retaining wall. The deep foundation and pier system is expected to protect against structural damage.

3.2.5 Impacts of Build Alternative 3

Construction of a visitor center at the Build Alternative 3 site would present fewer challenges associated with geologic resources than Build Alternative 2. Construction at this site would require grading and site preparation to create a level surface for construction. Substantial amounts of fill material could be required to establish a level site at an elevation consistent with Scenic Drive. With the exception of the intermittent stream valley to the west, gentle slopes surround the Build Alternative 3 site. Site stability would be similar to those described for Build Alternatives 1 and 4.

Construction at this site would require a total footprint of approximately 2 acres (1.5 acres within an approximate 2-acre alternative footprint area to construct the facility and parking lot, 0.2 acre to demolish the Abandoned Visitor Center, and approximately 0.5 acre of existing parking lot demolition). This site is more prone to erosion than Build Alternative 1 (1 acre), but a comparable footprint and comparable erosion to Build Alternative 2 (2 acres), and a smaller footprint and less soil exposure to erosion than Build Alternative 4 (3 acres). Much of this disturbance would be based on the need to construct a parking lot and access road aligned with either Scenic Drive or North Unit Maintenance Road.

The site is confined by the intermittent stream valley and gullies to the west and southwest. Based on the presence of coal seams throughout the area, coal seams are likely present beneath the site. Like the other Build Alternatives, a new visitor center located at this site would be constructed with a deep foundation system including deeper piers to mitigate the expansive soils and groundwater conditions; the deep foundation system is discussed in Chapter 2, Alternatives, with an example of a deep foundation and pier system shown in Figure 11. The lack of a basement, the use of piers to support the foundation, and grading to drain water away from the proposed building would protect the structure from subsurface water impacts that occurred with the Abandoned Visitor Center.

The susceptibility of the native soil to erosion by wind is higher on the southern edge of the Build Alternative 3 site due to slightly different physical properties, and the potential for erosion would be high during initial grading activities. However, fill material would be placed here to build up a level construction site, and the potential for erosion would be dependent on the physical properties of the fill material. Soil conditions of the remainder of the site are similar to those described for Build Alternatives 1 and 2. Water would flow south across the road into the unnamed drainage. Erosion control measures would be implemented to protect soil and water resources. An NPDES permit would be acquired, and measures for erosion control would be identified and implemented. Due to the need for fill material at this site and close proximity to the unnamed intermittent stream, more robust erosion control measures would be required than those at the Build Alternative 1 site, but less than at the Build Alternative 2 site (because of steep slopes), and would be comparable to the Build Alternative 4 site. Fill material would be clean from hazardous materials, appropriate for use as construction fill, and weed free to the extent practical in accordance with *Natural Resource Management Reference Manual #77* (NPS, February 5, 2004).

During the approximately 1-year construction period, short-term impacts on geologic resources would be adverse, localized within the construction footprint, and minor (temporary and barely affecting adjacent streams or existing vegetation outside of the construction footprint).

Long-term impacts would be minor, adverse, and localized because the Build Alternative 3 site and the new visitor center would be stable. Final grading and revegetation of the site would return erosion to pre-construction levels, conforming to NPDES permit conditions and NPS policies on restoration of altered sites to a more natural appearance. No indirect effects are anticipated on geologic resources.

In summary, there would be a short-term minor adverse local impact from construction (site grading, addition of fill material, and demolition of Abandoned Visitor Center and existing parking lot), and long-term minor adverse local impact due to site stability and restoration of land cover. The deep foundation and pier system is expected to protect against structural damage.

3.2.6 Impacts of Build Alternative 4

North to south slopes from Scenic Drive to just past the expected site of the visitor center are under 6 percent, while the west to east slope is milder at 0 to 2 percent. Construction on this site would require minor grading and could require the addition of fill to create a

properly draining and elevated access road bed and to level the surface for visitor center, new parking lot, and sidewalk construction. Additional land (approximately 0.2 acre, assuming a 10-foot-wide corridor of disturbance) would be disturbed for extension of utilities from the site of the Abandoned Visitor Center to the Build Alternative 4 site.

Construction at this site would require 3 acres of land to implement due to the longer access road needed; Build Alternative 4 would have a larger construction footprint than Build Alternative 1 (1 acre), Build Alternative 2 (2 acres), and Build Alternative 3 (2 acres). The new access road and parking lot would be asphalt and not be exposed to surface erosion once construction is complete. Consequently, the area of land that would be prone to erosion during construction activities and prior to restoration would be more than Build Alternative 1 and comparable to Build Alternatives 2 and 3. A portion of the existing parking lot would be retained to allow visitors to stop temporarily near the park entrance station and information kiosk. The disturbance to modify the existing parking lot would have a short-term potential for erosion.

The Build Alternative 4 site is loosely confined by the intermittent stream valley and gullies to the east, west, and south. Soil characteristics on this site are similar to the other Build Alternative sites. Based on the presence of coal seams throughout the area, coal seams are potentially present beneath the site. The visitor center would be located toward the center of this site. The lack of a basement, the use of piers to support the foundation, and grading to drain water away from the proposed building would better protect the structure from subsurface water impacts that occurred with the Abandoned Visitor Center; the deep foundation system, including deeper piers, is discussed in Chapter 2, Alternatives, with an example of a deep foundation and pier system shown in Figure 11.

Site stability is slightly different than described for Build Alternatives 1, 2, and 3 (those sites have landslide soils as the top layers and Alternative Site 4 has alluvium as the top soil layer). However, all sites share common soil types and properties because they were derived from the same original geology. The primary issues at the Build Alternative 4 site are expansive soils and erosion of gullies along intermittent streams both east and west of the site. Erosion control measures would be implemented to protect soil and water resources. An NPDES permit would be acquired, and measures for erosion control would be identified and implemented. Due to the larger size of the construction footprint, similar but more widespread erosion control measures would be required than those at the Build Alternative 1 and 3 sites. Build Alternative 2, with its greater topographic relief, would likely require more complex erosion measures than Build Alternative 4. Fill material would be clean from hazardous materials, appropriate for use as construction fill, and weed free to the extent practical in accordance with *Natural Resource Management Reference Manual #77* (NPS, February 5, 2004).

During the approximately 1-year construction period, short-term impacts on geologic resources would be adverse as earth-moving activities required to support road, parking lot, and visitor center construction would alter surface runoff characteristics and drainage patterns. With mitigation, earth-moving (for example, surface contouring and soil stabilization) impacts would be minor and localized, barely affecting adjacent streams or existing vegetation outside of the construction footprint.

Long-term impacts would be minor, adverse, and localized because the Build Alternative 4 site and the new visitor center would be stable. Final grading and revegetation of the site would return erosion to pre-construction levels, conforming to NPS policies on restoration of altered sites to a more natural appearance. No indirect effects are anticipated on geologic resources.

In summary, there would be a short-term minor adverse local impact from construction (site grading and demolition of Abandoned Visitor Center and most of existing parking lot). There would be a long-term minor adverse local impact due to site stability and restoration of land cover. The deep foundation and pier system is expected to protect against structural damage.

3.3 INVASIVE NON-NATIVE SPECIES

3.3.1 Affected Environment

Executive Order (EO) 13112 was issued to prevent the introduction of invasive species and provide control guidance to minimize the economic, ecological, and human health impacts that invasive species cause (EO 13112, February 1999). EO 13112 defines invasive species as “an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.” The term alien species is defined as any species, including its seeds, eggs, spores, or other biological material capable of propagating that species that is not native to that ecosystem (EO 13112, February 1999). Invasive plants are very aggressive species that actively invade and replace native plant communities. Potential harm caused by non-native invasive plants include the reduction in native wildlife habitat, and increased soil erosion caused by displacing native grasses and other plants that better protect the soils from blowing away.

In contrast, native species are defined as species that have occurred, now occur, or may occur as a result of natural processes on lands designated as units of the national park system (NPS, August 2006). The native vegetation of the park is considered part of the mixed prairie grassland ecosystem. All four Build Alternative sites are within land classified as Development Zone and are grassland/shrub habitat. The Build Alternative 1 site is largely developed land with sparse vegetative cover and is less of a native grassland than the other sites; portions of Build Alternative 3 also include areas classified as developed land (NPS, 1996). The existing vegetation that dominates the Build Alternative 2 and 3 sites are described as herbaceous grassland, consisting of crested wheatgrass (*Agropyron cristatum*), needle and thread grass (*Hesperostipa comata*), blue grama (*Bouteloua gracilis*), and threadleaf sedge (*Carex filifolia*) (NPS, April 18, 2013). The Build Alternative 4 site is an exotic grass-dominated grassland of crested wheatgrass (*Agropyron cristatum*), but includes approximately 0.2 acre of Green Ash-American Elm-Boxelder-Common Chokecherry-Western Snowberry (*Fraxinus pennsylvanica-Ulmus americana-Acer negundo-Prunus virginiana-Symphoricarpos occidentalis*) (NPS, April 18, 2013).

Over 60 species of non-native plants have been found at the park. Two non-native invasive species that have substantially impacted the natural environment of the park are leafy spurge (*Euphorbia esula*) and Canada thistle (*Cirsium arvense*). In North Dakota, leafy spurge infests nearly 1 million acres and approximately 4,000 acres in the park.

The acreage of spotted knapweed infestation is considerably less than Canada thistle and leafy spurge, but spotted knapweed will readily establish on any soil surface and is increasing its range in North Dakota at a rate of 175 percent per year. Aggressive invasive species have rapidly invaded the grasslands and reduced the growth of native plant species. The invasive species can multiply rapidly because they often thrive on disturbed soils and grow without their native controls such as insects, diseases, and competing plants (NPS, n.d., a).

The management of non-native invasive plants is one of the park's management priorities, with a current focus on seven plant species: leafy spurge, spotted knapweed (*Centaurea maculosa*), Russian knapweed (*Centaurea repens*), Canada thistle, black henbane (*Hyoscyamus niger*), absinth wormwood (*Artemisia absinthium*) and salt cedar or tamarisk (*Tamarix ramosissima*) (NPS, n.d., b). Leafy spurge and Canada thistle receive the most treatment annually; the others are important but historically have received far less treatment, time, and funding spent controlling them.

In 2002, the park became the headquarters of the NPS Northern Great Plains Exotic Plant Management Team (NGP EPMT). In 2013, the NGP EPMT was moved from the park to NPS facilities in Rapid City, South Dakota, with a seasonal spray crew being assigned to the park each spring/summer from 2012 to the present. According to the 2012 annual report from the NPS Exotic Plant Management Team Program, invasive species are one of the major factors contributing to ecosystem change and invasive exotic species are the second greatest threat to biodiversity (Beard and App., June 2013).

3.3.2 Impacts of No Action Alternative

The No Action Alternative would have a negligible adverse local impact on invasive species over the short and long term. As with the Abandoned Visitor Center, control of invasive plants would still be required after the facility is demolished and the site revegetated. Impacted sites would continue to be managed for the control of invasive non-native plants in accordance with Executive Order 13112 (1999). The Abandoned Visitor Center, temporary trailers, Campender's Cottage, and Quarters 205B are outside of but near wilderness areas. NPS Director's Order #41 requires Parks to be managed with the goal of early detection and rapid response in areas adjacent to wilderness areas to prevent the spread the non-native invasive species (NPS, May 2013). The monitoring, prevention, and control of invasive species would continue to be performed by park staff and the NGP EPMT. The park would continue implementation of an integrated pest management program that considers chemical, mechanical, and biological control methods to fight invasive non-native species.

In summary, there would be a short- and long-term negligible adverse local impact on invasive species with no disturbance of land cover.

3.3.3 Impacts of Build Alternative 1

Implementation of Build Alternative 1 would result in a short-term, local, minor adverse impact on the establishment of invasive non-native species. Activities associated with this alternative include construction of a new visitor center, demolition of the Abandoned Visitor Center, and transfer of operations from the Temporary Visitor Center and temporary administrative facility. These activities would result in localized ground

disturbance of approximately 0.5 to 1 acre of vegetation removal, plus disturbance of approximately 0.2 acre of vegetation adjacent to the Abandoned Visitor Center during its demolition. This disturbance would provide the opportunity for invasive plant species to multiply and potentially invade nearby areas of native vegetation. In addition, the use of construction equipment and imported fill would increase the potential for the introduction of an invasive non-native species. Imported fill has the potential to contain and introduce invasive non-native species. The construction footprint of Build Alternative 1 is minimized by using the existing parking lot, which reduces the disturbed area and potential for introducing invasive non-native species. The completed building and walkways would reduce the 1-acre area of impact by approximately 6,500 square feet (0.15 acre), as invasive plants could not occupy that space. Compared to other Build Alternatives, Build Alternative 1 would result in the least amount of ground disturbance and the potential for invasive species propagation.

Following construction of a new visitor center, the temporary administrative and visitor centers would revert back to their traditional uses and typical management practices would continue to be implemented. The monitoring, prevention, and treatment of invasive plant species would continue to be implemented through park staff and the NGP EPMT.

Build Alternative 1 would have a long-term negligible (not noticeable) adverse local impact on invasive non-native species. Short-term impacts would be minor (barely noticeable), adverse, and localized because of the proposed resource protection measures discussed in Section 2.3. The implementation of these measures would limit the establishment and spread of invasive non-native species. These measures include those discussed in the NPS *Natural Resource Management Reference Manual #77*, Disturbed Land Restoration and Soil Resources Management. Section 4.1.5 of the manual describes efforts to re-establish natural functions in areas disturbed by human activities, such as the construction of Build Alternative 1. Manual guidelines for using soil imported from areas outside the park include the inspecting of imported soil prior to bringing it in the park to determine the adequacy of the soil and if seeds of non-native species are present in the soil (NPS, n.d., a). No indirect effects on invasive non-native species are anticipated.

In summary, there would be a short-term minor adverse local impact on the establishment of invasive non-native species from construction of a new visitor center and demolition of the Abandoned Visitor Center. There would be a long-term negligible adverse local impact due to BMPs.

3.3.4 Impacts of Build Alternative 2

Implementation of Build Alternative 2 would result in the short-term minor adverse local impact on invasive non-native plant species if the visitor center were constructed on the hill. Short-term impacts of constructing the site at a similar elevation as Scenic Drive would be moderate, adverse, and local due to the greater disturbance of the site. Implementation of Build Alternative 2 would include the demolition of the abandoned visitor center and parking lot (except for a small area of the lot that could be reused as part of the access road to the proposed visitor center), construction of a new visitor center and parking lot, and transfer of operations from the Temporary Visitor Center and

temporary administrative facility. Impacts resulting from this alternative would be similar to but greater than the impacts of Build Alternative 1. Build Alternative 2 would require more imported fill to level the site and would disturb approximately 2 acres to construct both a new visitor center and new parking lot. The greater area of disturbance and larger fill volume increases the potential for the introduction and establishment of invasive non-native plants. The completed building, parking lot, walkways, and access road would reduce the 2 acre area of impact by approximately 0.35 acre as invasive plants could not occupy that space.

As described for Build Alternative 1, a new visitor center would have a long-term negligible (not noticeable) adverse local impact associated with non-native plant species with the implementation of the protective measures described in Section 2.3. No indirect effects on invasive non-native species are anticipated.

In summary, there would be a short-term minor adverse local impact on the establishment of invasive non-native species from construction of a new visitor center on a hill and demolition of the Abandoned Visitor Center. If constructed level with Scenic Drive, there would be a short-term moderate adverse local impact due to greater disturbance and use of retaining wall. There would be a long-term negligible adverse local impact due to BMPs.

3.3.5 Impacts of Build Alternative 3

Implementation of Build Alternative 3 would require the construction of a new visitor center and demolition of the Abandoned Visitor Center and parking lot, construction of a new parking lot, and transfer of operations from the Temporary Visitor Center and temporary administrative facility. The impacts on invasive non-native species resulting from Build Alternative 3 would be similar to Build Alternative 2. The area potentially disturbed for construction would be similar to Build Alternative 2, approximately 1.9 acres. The completed building, parking lot, and access road would reduce the 2-acre area of impact by approximately 0.4 acre as invasive plants could not occupy that space. These activities would result in a short-term minor (barely noticeable) adverse local impact on invasive non-native plant species. As described for Build Alternative 1, a new visitor center would have a long-term negligible (not noticeable) adverse local impact associated with non-native plant species with the implementation of the protective measures described in Section 2.3. No indirect effects are anticipated.

In summary, there would be a short-term minor adverse local impact on the establishment of invasive non-native species from construction of a new visitor center and demolition of the Abandoned Visitor Center. There would be a long-term negligible adverse local impact due to BMPs.

3.3.6 Impacts of Build Alternative 4

Implementation of Build Alternative 4 would require the construction of a new visitor center, a 300-foot-long access road off Scenic Drive, demolition and site restoration of the Abandoned Visitor Center, and transfer of operations from the Temporary Visitor Center and temporary administrative facility. The impacts on invasive non-native species resulting from Build Alternative 4 would be similar to Build Alternative 3. The area potentially disturbed for construction would be greater than the other Build Alternatives,

approximately 3 acres. The completed building, parking lots, and access road would reduce the 3 acre area of impact by approximately 0.5 acre as invasive plants could not occupy that space. These activities would result in a short-term minor (barely noticeable) adverse local impact on invasive non-native plant species. As described for Build Alternative 1, a new visitor center would have a long-term negligible (not noticeable) adverse local impact associated with non-native plant species with the implementation of the protective measures described in Section 2.3. No indirect effects are anticipated.

In summary, there would be a short-term minor adverse local impact on the establishment of invasive non-native species from construction of a new visitor center and demolition of the Abandoned Visitor Center. There would be a long-term negligible adverse local impact due to BMPs.

3.4 VISITOR EXPERIENCE AND AESTHETIC RESOURCES

3.4.1 Affected Environment

Management Policies 2006 (NPS, August 2006) states that enjoyment of the NPS resources and values by the public is part of the fundamental purpose of all parks and that NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks. NPS seeks to (1) preserve natural resources and systems; (2) preserve cultural resources; and (3) sustain visitor enjoyment, human health, and scenic vistas.

The area near the entrance to the park (in the vicinity of the Abandoned Visitor Center) provides a welcome point for park visitors. The Abandoned Visitor Center is located approximately 1,200 feet west of the park entrance off US 85. This area of the park is designated as “Development Zone”, where development of facilities to support the park’s mission is compatible with park purposes. A designated Wilderness Area, a primary resource of the park, begins approximately 1,500 feet northwest of the Abandoned Visitor Center. Interpretive displays of park features and park maps are displayed in the Interpretive Kiosk near the entrance station, also formerly handled in the Abandoned Visitor Center, remain an important component of the visitor’s welcome and introduction to park resources. Other visitor center amenities, such as restrooms, are an important component of the visitor’s welcome.

Theodore Roosevelt National Park is the number one tourist destination in the state. Approximately 92 percent of park visitors place “scenery viewing” as an important factor in visiting the park. Unpolluted air is essential for human and plant health and directly contributes to the ability of people to see and photograph Little Missouri River Badlands scenery and wildlife. Approximately 97 percent of the park is in a natural or near-natural condition, and the implications to park management from diminished air quality are clear: a reduction in the health of the park’s natural areas and decline in the quality of the visitor experience and associated tourism revenue.

Theodore Roosevelt National Park has been designated in the Clean Air Act as a Mandatory Federal Class I area. A Class I area is one in which visibility is protected more stringently than under the national ambient air quality standards. Class I areas include national parks, wilderness areas, monuments, and other areas of special national and cultural significance. Air quality effects on visibility are an important consideration for aesthetics and impacts on visitor experience because the park is treasured for its

vistas. The State of North Dakota is in attainment status for all criteria pollutant standards for air quality. The State of North Dakota operates an air quality monitoring site at the North Unit. Average concentrations used for determining air quality standards have been relatively steady the last several years (North Dakota Department of Health, August 2013). During 2012, concentrations of ozone averaged approximately 80 percent of the Federal standard. Particulate matter 2.5 micrometers in diameter averaged approximately 50 percent of the Federal standard. The main source of pollutants in the park is vehicle traffic. Within and adjacent to the Project area, potential sources of air pollutants include energy-related development, existing oil and gas well operation, natural gas processing plants, park residential and administrative buildings, and increasingly heavy volumes of vehicle traffic on park, county, and state roads. Several oil and gas wells are located within 0.5 mile of the park, and the closest natural gas processing plant is 3 miles to the west.

Over the last 5 years, the number of visitors to the North Unit has ranged from 54,347 in 2009 to 129,981 in 2012. In 2013, the North Unit attracted 90,912 visitors, approximately 20 percent of the total number of visits to Theodore Roosevelt National Park. The number of visits to the North Unit was down approximately 30 percent from 2012. Approximately 68 percent of the visits in 2013 were between June and September with monthly visits ranging from 342 in January to 18,708 in July (NPS, n.d., b).

The current visitor experience is diminished by the visual and functional shortcomings of temporary facilities and the lack of a consistent and adequately designed visitor center. The previously used Temporary Visitor Center is approximately 4.9 miles from the Abandoned Visitor Center. This distance removes the park point-of-contact from the public as they enter the park. The previous Temporary Visitor Center and (expected) use of trailers near the park entrance are both inadequate in space, services offered, and functions for the growing number of park visitors. Also, the Temporary Visitor Center is closed from mid- to late fall until spring because it was not designed to be occupied in winter, and Scenic Drive and Juniper Campground Road are often closed during winter and early spring due to extreme winter weather and occasional flooding events.

3.4.2 Impacts of No Action Alternative

Whether it is the Camptenders building or trailers in the vicinity of the Abandoned Visitor Center, implementation of the No Action Alternative would result in the continued use of inadequate temporary visitor centers for the North Unit. Interpretive displays of park features, park maps, and visitor amenities such as restrooms would continue to partially meet visitor needs. The previously used Temporary Visitor Center is undersized; the structure was not built to serve as a visitor center, provides only seasonal not year-round access, and is located nearly 5 miles from the park entrance. Until demolished, the continued presence of the structurally unsafe Abandoned Visitor Center would also present a safety issue and could detract from the appearance of the park. The use of two trailers in close proximity to the Abandoned Visitor Center would provide year round visitor services and administrative office space, but are inadequate in terms of size, energy efficiency, amenities, and layout. The No Action Alternative would have a short-term moderate adverse impact throughout Theodore Roosevelt National Park North Unit on visitor experience and aesthetics (impacting the experience of a large number of visitors and noticeably decreasing the quality of the experience). As the number of park

visitors continues to increase and the condition of the Abandoned Visitor Center deteriorates, the long-term moderate adverse impact throughout Theodore Roosevelt National Park North Unit on visitor experience (including tourism) and aesthetic resources would intensify.

Air quality in the Juniper Campground area of the North Unit would continue to be affected by increased vehicular traffic to the Temporary Visitor Center. The impact would be minor (a barely noticeable change from current conditions), and these emissions would not be expected to cause a violation of air quality standards. Vehicular noise along Scenic Drive and Juniper Campground Road would continue to increase noise levels within Juniper Campground and nearby wilderness areas. However, the noise would be much less than that experienced from US 85 traffic near the Abandoned Visitor Center. Short-term moderate impacts are adverse (noticeably decreasing the quality of experience for a large number of visitors); and would continue to increase over the long term as the number of park visits increases.

In summary, there would be a short-term moderate adverse impact throughout Theodore Roosevelt National Park North Unit on visitor experience and aesthetics from continued use of temporary visitor center facilities and continued presence of the structurally unsafe Abandoned Visitor Center. There would be a long-term moderate adverse impact throughout Theodore Roosevelt National Park North Unit that would diminish somewhat with the demolition of the Abandoned Visitor Center.

3.4.3 Impacts of Build Alternative 1

Construction of a new visitor center would temporarily affect local air quality because land disturbance of approximately 1 acre would generate emissions of particulate matter from fugitive dust. Noise from construction equipment and activities would temporarily modify the park soundscape. The construction equipment and construction site would impact the viewshed and aesthetic resources in the vicinity of construction. These short-term impacts would last approximately 1 year and would be minor adverse impacts (affecting a few visitors, but resulting in little change to the quality of the experience) throughout Theodore Roosevelt National Park North Unit on visitor experience and aesthetics in the vicinity of construction. The short-term impacts would be less than Build Alternative 2 if constructed at a similar elevation as Scenic Drive and Build Alternatives 3 and 4 because of the smaller footprint of disturbance. With mitigation listed in Section 2.3, impacts would not violate any regulatory standards or NPS policies.

In the long-term, the new visitor center would provide a highly visible location near the North Unit entrance with signs, exhibit space for interpretive displays, and public amenities, such as restrooms. The new visitor center would be designed and constructed in accordance with ADA, the Architectural Barriers Act Accessibility Standards, and Uniform Federal Accessibility Standards.

A visitor center constructed at this site would be subject to increasingly high noise levels generated from US 85 traffic. Noise levels would further increase with the planned expansion of US 85 to four lanes, and if the land between the Abandoned Visitor Center and US 85 were developed. Anticipated noise levels would be comparable to Build Alternative 2 and 3, but would likely be several decibels higher than what would be experienced at Build Alternative 4.

The new visitor center would minimally disturb the landscape. To the extent possible, materials from the Abandoned Visitor Center would be used to construct the new facilities. To minimize the impact on aesthetics, colors would be selected to match or blend into the surrounding environment. Native vegetation of sufficient height and adapted for this site would be planted to provide a visual buffer of the parking lot from other areas of the park (NPS, January 16, 2014).

Build Alternative 1 would result in long-term moderate beneficial impacts (noticeably increasing the quality of experience for a large number of visitors) throughout Theodore Roosevelt National Park North Unit on visitor experience (including tourism), and a negligible (not noticeable) adverse local impact on aesthetic resources. Due to higher noise levels experienced from traffic on US 85, and a view more dominated by US 85, Build Alternative 1 would result in a slightly less beneficial impact than Build Alternative 4. The new visitor center would meet NPS standards for visitor experience and accessibility. No indirect effects are anticipated.

In summary, there would be a short-term minor adverse impact throughout Theodore Roosevelt National Park North Unit on aesthetics and visitor experience from construction of the proposed visitor center. There would be a long-term moderate beneficial impact throughout Theodore Roosevelt National Park North Unit from easily identifiable and improved facilities. The proposed visitor center would aesthetically blend into the existing landscape; resulting in a long-term negligible adverse local impact.

3.4.4 Impacts of Build Alternative 2

Build Alternative 2 would affect visitor experience and aesthetics through disturbance of an approximately 2-acre area for development of a visitor center, access road, and parking lot. Construction activities would affect a larger area than Build Alternative 1, and would involve much more excavation. Short-term impacts on visitor experience and aesthetics would be greater than Build Alternative 1. The Build Alternative 2 footprint is smaller than Build Alternatives 3 and 4, so it would likely cause less short-term aesthetic impact than Build Alternatives 3 and 4. A long-term, minor positive impact throughout Theodore Roosevelt National Parks North Unit on visitor experience (including tourism) is anticipated if the visitor center would be constructed on the hill (noticeably increasing the visibility of the building to new visitors), and a long-term moderate adverse local impact (increased visibility of the structure detracts from the natural landscape) on aesthetic resources.

As in Site 1, a new visitor center constructed at this site would be subject to increasing noise levels generated from US 85 traffic. Noise levels could further increase with the planned expansion of portions of US 85 to four lanes and potential development of the area between the Abandoned Visitor Center and US 85. Anticipated noise levels would be comparable to Build Alternative 1 and 3, but would likely be several decibels higher than what would be experienced at Build Alternative 4.

Excavation to establish a level site would be more obvious, would generate more construction emissions affecting visibility, and would generate more noise caused by additional construction activities than Build Alternative 1. Disturbance to the existing landscape would be more adverse than Build Alternative 1 because the new visitor center

would need to meet the same accessibility standards as the other Build Alternatives, and meeting them on a site with greater topographic relief would result in a greater visual impact on the natural landscape. To the extent possible, materials from the Abandoned Visitor Center would be used to construct the new facilities. To partially mitigate impact on aesthetic resources, colors would be selected to match or blend into the surrounding environment. Vegetation would be planted to provide a visual buffer of the parking lot from other areas of the park (NPS, January 16, 2014). The new visitor center would meet NPS standards for visitor experience and accessibility. In summary, there would be a short-term moderate adverse impact throughout Theodore Roosevelt National Park North Unit from construction if the proposed visitor center were constructed on a hill, and short-term minor adverse local impact if it were constructed level with Scenic Drive. Long-term, positive impacts are expected from a highly visible building higher on the hill, but long-term, moderate adverse impacts to the natural landscape are also expected; addition of a retaining wall supporting a visitor center level with Scenic drive would result in a localized long-term, minor adverse impact.

3.4.5 Impacts of Build Alternative 3

Build Alternative 3 would temporarily affect visitor experience and aesthetics through disturbance of an approximately 2 acre area for development of a visitor center and parking lot. Based primarily on the affected area, short-term impacts to visitor experience and aesthetics would be greater than Build Alternative 1, but slightly less than Build Alternatives 3 and 4. Placement of fill material to establish a level site would be more obvious, would generate more construction emissions affecting visibility, and would generate more noise from construction activities compared to Build Alternative 1. Although the area affected under Build Alternative 3 is slightly greater than Build Alternative 2, construction activities would be anticipated to take less effort to complete (with fewer impacts on aesthetics and visitor experience) based on the large amount of excavation required for Build Alternative 2. Disturbance to the existing landscape would be more adverse than Build Alternative 1 because the Build Alternative 3 site is larger and would require the construction of a new parking lot. Impacts on aesthetics would be slightly less than Build Alternative 4 because of its larger footprint.

A new visitor center constructed at this site would be subject to increasing noise levels generated from US 85 traffic. Noise levels would further increase with the planned expansion of US 85 to four lanes and potential development of the area between the Abandoned Visitor Center and US 85. Anticipated noise levels would be comparable to Build Alternative 1 and 2, but would likely be several decibels higher than what would be experienced at Build Alternative 4.

A short-term moderate adverse local impact (noticeably affecting the appearance of the affected area) on aesthetics is anticipated. A short-term minor adverse impact (affecting a few visitors, but resulting in little change to the quality of the experience) throughout Theodore Roosevelt National Park North Unit on visitor experience is anticipated.

The new visitor center would provide the same public amenities and meet the same accessibility standards as the other Build Alternatives. To the extent possible, materials from the Abandoned Visitor Center would be used to construct the new facilities. To minimize the impact on aesthetic resources, colors would be selected to match or blend

into the surrounding environment. Vegetation would be planted to provide a visual buffer of the parking lot from other areas of the park (NPS, January 16, 2014).

Build Alternative 3 would result in long-term moderate beneficial local impacts (noticeably increasing the quality of experience for a large number of visitors) on visitor experience (including tourism), and a minor impact (resulting in little change to the quality of the experience) on aesthetic resources. Due to higher noise levels experienced from traffic on US 85, and a view more dominated by US 85, Build Alternative 3 would result in a slightly less beneficial impact than Build Alternative 4. The new visitor center would meet NPS standards for visitor experience and accessibility. No indirect effects are anticipated.

In summary, there would be a short-term moderate adverse local impact on aesthetics from construction, and short-term minor adverse impact throughout Theodore Roosevelt National Park North Unit on visitor experience. There would be a long-term moderate beneficial impact throughout Theodore Roosevelt National Park North Unit from easily identifiable and improved facilities. Level with Scenic Drive, the proposed visitor center would better blend into existing landscape, minimizing adverse impact on the natural landscape; construction higher on the hilltop would result in a greater long-term adverse impact.

3.4.6 Impacts of Build Alternative 4

Construction related activities for Build Alternative 4 would affect visitor experience and aesthetics through initial disturbance of an approximately 3-acre area. Of the 3-acre disturbance area, 0.5 acre represents the permanent construction footprint and includes the access road, visitor center, and parking lot (including the new lot, and demolition and modification for reuse of a portion of the existing lot). Based primarily on the affected area, short-term impacts on visitor experience would be greater than Build Alternatives 1, 2, and 3. Placement of fill material to establish a roadbed and level building site would be required, would generate more construction emissions affecting visibility, and would generate more noise from construction activities compared to the other Build Alternatives. Extending utilities to the site would also generate additional air emissions and noise, and would affect traffic on Scenic Drive. The area affected and construction footprint under Build Alternative 4 is greater than Build Alternatives 1, 2, and 3, and construction activities would be anticipated to take longer to complete (with continued impacts on aesthetics and visitor experience) based on the construction of an access road and parking lot. However, a portion of the existing parking lot would remain open during a portion of the construction period. A short-term moderate adverse impact on aesthetics (noticeably affecting the appearance of the affected area) is anticipated. A short-term, minor, adverse impact (affecting a few visitors, but resulting in little change to the quality of the experience) throughout Theodore Roosevelt National Park North Unit on visitor experience is anticipated.

A new visitor center constructed at this site would be subject to increasing noise levels generated from US 85 traffic. Noise levels would further increase with the planned expansion of US 85 to four lanes. Anticipated noise levels would likely be several decibels lower than what would be experienced at Build Alternatives 1, 2, and 3.

The new visitor center would provide the same public amenities and meet the same accessibility standards as the other Build Alternatives. Also, reuse of a portion of the existing parking lot would allow visitors to stop near the park entrance and take pictures. To the extent possible, materials from the Abandoned Visitor Center would be used to construct the new facilities. To minimize the impact on aesthetic resources, colors would be selected to match or blend into the surrounding environment. Vegetation would be planted to provide a visual buffer of the parking lot from other areas of the park (NPS, January 16, 2014).

Build Alternative 4 would result in long-term moderate beneficial impact (noticeably increasing the quality of experience for a large number of visitors) throughout Theodore Roosevelt National Park North Unit on visitor experience (including tourism). Build Alternative 4, located on gently sloping ground approximately 700 feet west of the Abandoned Visitor Center, would provide a view more dominated by the park's natural landscape than Build Alternatives 1, 2, and 3. Consequently, the long-term visual impact on visitor experience would be slightly more beneficial than the impact under Build Alternatives 1, 2, and 3. The new visitor center and parking lot would meet NPS standards for visitor experience and accessibility. No indirect effects are anticipated.

In summary, there would be a short-term moderate adverse local impact on aesthetics from construction, and short-term minor adverse impact throughout Theodore Roosevelt National Park North Unit on visitor experience. There would be a long-term moderate beneficial impact throughout Theodore Roosevelt National Park North Unit from easily identifiable and improved facilities. The proposed visitor center would be constructed slightly closer to some wilderness area and near the parks residential and maintenance buildings, but on a lower elevation than the other build alternatives resulting in a long-term minor beneficial impact.

3.5 RECREATION RESOURCES

3.5.1 Affected Environment

For the purposes of this assessment, the recreational resources evaluation focuses on resources available in the North Unit of the park, including camping, hiking, horseback riding, biking, cross-country skiing, snowshoeing, fishing, boating, canoeing, and kayaking. The Theodore Roosevelt Wilderness Area is managed by the NPS and encompasses 29,920 acres within the North Unit and South Unit. The majority of the North Unit is composed of Designated Wilderness, but the Abandoned Visitor Center, Temporary Visitor Center sites, and four Build Alternatives are not within the wilderness area boundaries (NPS, n.d., c).

Juniper Campground is the only park campground located in the North Unit. The Juniper Campground accommodates tents, most trailers and recreational vehicles, but no recreational vehicle hook-ups are available to the public. The campground is open year-round and includes 50 individual sites and one group site that can accommodate between 7 and 60 people. Facilities at the Juniper Campground include flush toilets during the main visitor season and pit toilets year-round. There is also a dump station and water fill station for recreational vehicles during the main visitor season. The campground also features spigots for drinking water (water is available late spring through early fall),

picnic tables, and grills. In addition to the Juniper Campground, the North Unit of the park also features backcountry camping opportunities (NPS, n.d., c).

Maintained hiking trails in the North Unit are:

- Little Mo Trail (0.7 mile paved inner loop and 1.1 miles unpaved outer loop)
- Caprock Coulee Nature Trail (1.5 miles)
- Prairie Dog Town Trail (1.5 miles)
- Sperati Point Trail (1.5 miles)
- Caprock Coulee Trail (4.3 miles)
- Buckhorn Trail (11.4 miles)
- Achenbach Trail (18 miles)

The trails are shown in Figure 2. The Buckhorn Trail, Little Mo Trail, and Achenbach Trail are located near the Juniper Campground and Temporary Visitor Center. There are no trails within the Project area (NPS, n.d., c).

The park trail system, except for the developed nature trails, is open to horse use. Cross-country horseback travel is also allowed. Located just south and east of the North Unit is a U.S. Forest Service group campsite (CCC Campground) that allows horses (see Figure 2) (NPS, n.d., c).

Paved roads in the park are open to biking, but hiking trails and other off-road travel are closed to bicycling. While trails are not groomed for skiing, the park offers cross-country skiing and snowshoeing. The Little Missouri River also offers recreational opportunities, including fishing, boating, canoeing, and kayaking (NPS, n.d., c).

3.5.2 Impacts of No Action Alternative

Under the No Action Alternative, the current conditions of the Temporary Visitor Center and temporary administrative facility would remain unchanged. This alternative would adversely impact some recreational experiences and resources at times by causing congestion near the Juniper Campground or the temporary visitor center trailers on Scenic Drive. Alternatively, the use of trailers near the Abandoned Visitor Center as a temporary visitor center would alleviate congestion in the campground but due to limited display and interpretive opportunities, would inadequately promote recreational opportunities available to park visitors. Overall, short- and long-term impacts would be minor, adverse, and local (affecting a few visitors, but resulting in little change to the quality of the experience). Under the No Action Alternative, there would be no change to the use of existing recreational resources.

In summary, there would be a short- and long-term minor adverse local impact due to congestion in campground areas from use of the Temporary Visitor Center and use of temporary trailers placed near the park entrance.

3.5.3 Impacts of Build Alternative 1

The construction of Build Alternative 1 would have a short-term minor adverse local impact (affecting a few visitors, but resulting in little change to the quality of the experience) on recreational activities during the construction of the new visitor center. During the construction period, construction activities may delay traffic near the site of Build Alternative 1. Access to recreational trails and other resources in the North Unit are west of the site for Build Alternative 1, requiring visitors to travel through the construction area. These minor impacts on visitors' ability to access recreational resources would last throughout the approximately one year construction period.

Development of Build Alternative 1 would result in a long-term moderate beneficial local impact (noticeably increasing the quality of experience for a large number of visitors) on recreational resources with the improved facilities associated with the new visitor center. The impacts would be similar to those of the other Build Alternatives. The construction of a new visitor center would allow the Camptender's Cottage and Quarters 205B to return to their original use and provide facilities better suited for a visitor center. The new visitor center would be located near the Abandoned Visitor Center near the entrance to the North Unit and would provide visitors a larger and more convenient location to obtain information on the park recreational resources. Following construction of the new visitor center, traffic would decrease to Camptender's Cottage and Juniper Campground. The resulting decrease in congestion would provide easier access to the Juniper Campground, the hiking trails, and other recreational resources in the area.

None of the trails, campsites, or other recreational resources would be affected by construction and development of Build Alternative 1. This alternative would not diminish recreation or wilderness values. No indirect effects are anticipated.

In summary, there would be a short-term minor adverse local impact due to construction, and long-term moderate beneficial local impact from improved facilities.

3.5.4 Impacts of Build Alternative 2

The impacts from Build Alternative 2 would be similar to those discussed under Build Alternative 1, and would also be similar to those that would occur for Build Alternatives 3 and 4. The construction of the proposed visitor center would have a short-term minor adverse local impact on recreational activities as described for Build Alternative 1. Implementation of Build Alternative 2 would result in long-term moderate beneficial local impact on recreational resources (noticeably increasing the quality of experience for a large number of visitors).

None of the trails, campsites, or other recreational resources would be affected by construction and development of Build Alternative 2. This alternative would not diminish recreation or wilderness values. No indirect effects are anticipated.

In summary, there would be a short-term minor adverse local impact due to construction, and long-term moderate beneficial local impact from improved facilities.

3.5.5 Impacts of Build Alternative 3

Similar to the other Build Alternatives, the impacts on recreational resources from development of Build Alternative 3 would result in short-term minor adverse local impact on recreational activities during construction. The new visitor center would result in long-term moderate beneficial local impacts, similar to the other Build Alternatives.

None of the trails, campsites, or other recreational resources would be affected by construction and development of Build Alternative 3. This alternative would not diminish recreation or wilderness values. No indirect effects are anticipated.

In summary, there would be a short-term minor adverse local impact due to construction, and long-term moderate beneficial local impact from improved facilities.

3.5.6 Impacts of Build Alternative 4

Similar to Build Alternatives 1, 2, and 3, the impacts on recreational resources from development of Build Alternative 4 would result in short-term minor adverse local impact on recreational activities during construction. The new visitor center would result in long-term moderate beneficial local impacts, similar to Build Alternatives 1, 2, and 3.

None of the trails, campsites, or other recreational resources would be affected by construction and development of Build Alternative 4. This alternative would not diminish recreation or wilderness values. No indirect effects are anticipated.

In summary, there would be a short-term minor adverse local impact due to construction, and long-term moderate beneficial local impact from improved facilities.

3.6 CUMULATIVE IMPACTS

The potential for cumulative impacts from past, present, and reasonably foreseeable future actions was assessed, with a focus on resources carried forward for further evaluation. Figure 18 shows the location of actions discussed in this section.

Past Actions

Much of the Theodore Roosevelt National Park North Unit is in the same condition as it was thousands of years ago. Over the past 100 years, trails and roadways have been established along with some facility construction, supported by infrastructure improvements. More recently, there have been local improvements by the North Dakota Department of Transportation (NDDOT) and NPS; these improvements are described below.

In 2002, NDDOT repaired damage from a landslide along US 85 approximately 2 miles south of the North Unit entrance. In 2009, NDDOT graded and repaved 6 miles of US 85 starting 0.5 mile south of the North Unit entrance and extending southward. A small segment of US 85 added passing lanes extending from Long X Bridge near the southern border of the North Unit to about 1 mile north of the park entrance, with construction completed in 2013 (Baker, 2014). Also, the Long X Bridge was repaired (a truck damaged steel beams) and resurfaced between 2011 and 2013.

Within Theodore Roosevelt National Park, segments of Scenic Drive have required repairs over the past several decades due to ongoing erosion and shifting soils typical of Little Missouri River Badlands. More extensive ground failures in 2002 and 2006

resulted in a larger project to rehabilitate and repair Scenic Drive throughout its 14-mile length in 2008. An EA was prepared to assess potential environmental impacts of the rehabilitation and repair project. Much of the major road damage was focused in the Cedar Canyon area and is not in close proximity to the Abandoned Visitor Center or Build Alternatives. Soon after the 2008 repair project was completed, portions of the roadway in Cedar Canyon began to fail again, and more work has been required to correct the failures (Whitworth, 2014).

In addition to work on Scenic Drive, some routine rehabilitation work was completed in the Project area to improve the parking area at the Abandoned Visitor Center to meet ADA requirements.

The Abandoned Visitor Center was constructed in 1992, and structural movement was observed soon after construction was completed. A study was completed in 1998 that evaluated the situation and led to a project in 2001 that temporarily resolved most of the problems. Subsequent and continued structural movement has led to the abandonment of the building.

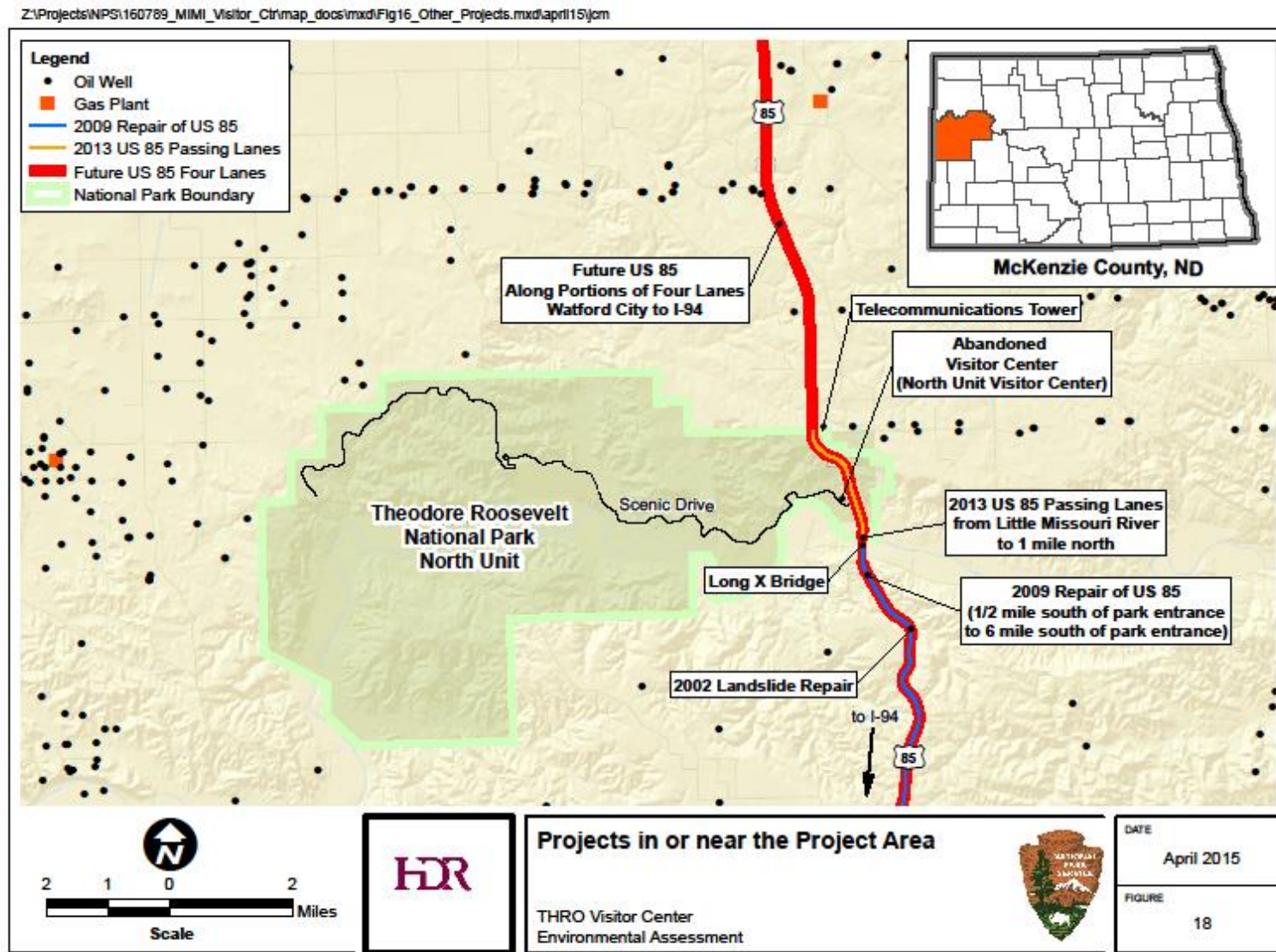
Current and Future Actions

Segments of Scenic Drive can be expected to fail or require routine rehabilitation or replacement into the foreseeable future as erosional forces in the Little Missouri River Badlands are constant and destructive to park infrastructure. There are no plans to increase the road footprint of Scenic Drive within the park, but occasional road repairs will continue to occur.

NDDOT is implementing a long-term plan to expand US 85 to four lanes along all or portions of its length. Regardless of US 85 expansion potential, traffic on US 85 increased from 1,000 vehicles (including 250 commercial trucks) per day in 2005 to 5,165 vehicles (including 2,030 commercial trucks) per day in 2014, exposing park visitors to increasingly higher traffic volumes and associated sound levels (NDDOT, not dated, a). A segment of the highway from Watford City to Alexander was evaluated under NEPA with a Categorical Exclusion in 2012 and construction was completed in 2014. The segment from Alexander to Williston was evaluated for potential impacts in an EA and Finding of No Significant Impact (FONSI) that was signed in November 2014; construction started in 2014 and is expected to be finished in 2016 (NDDOT, not dated, b). There is also some discussion regarding the potential for US 85 modifications, including the construction of one or more wildlife crossings on hills north and south of the Long X Bridge valley. This region is a major movement corridor for bighorn sheep populations, and the incorporation of a crossing is expected to reduce future traffic-sheep collisions, which are currently substantial.

The segment of US 85 from Watford City to Interstate 94 (I-94) passes by the entrance to the North Unit and is planned for concept design and NEPA evaluation. Potential alternatives under consideration include expanding US 85 to four lanes along portions of the existing alignment, expanding and correcting for curvature, and constructing four lanes off alignment (Baker, 2014).

Figure 18
Projects in or near the Project Area



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A proposal to replace an existing park tower and co-locate telecommunications equipment with a commercial provider and U.S. Forest Service is being evaluated by the park. The tower (north of the Abandoned Visitor Center and just north of US 85 as it bends to the west) is currently used to support the park and Forest Service radio system and, due to its height, has a blinking light on top for airplane flight visibility. The project could result in a shorter tower with no blinking light, and a larger utility shed than currently exists.

In addition to road improvements, extensive energy-related development is occurring in the region surrounding the park. Oil/gas wells servicing the underlying Bakken Formation exist in several locations approximately 0.5 mile outside the North Unit boundary. Two natural gas processing plants are located approximately 3 miles west-northwest and approximately 5 miles north-northeast of the North Unit. These plants are designed to capture natural gas that would otherwise be burned off at well sites. It is anticipated that more wells will be developed and continued fracking will occur in this region for at least the next few decades.

3.6.1 No Action Alternative

Further slumping of the slope to the north, northeast, and northwest of the Abandoned Visitor Center is likely to occur whether or not the Project is constructed. Impacts on geological resources would be limited to the area near the Abandoned Visitor Center and would not contribute to ongoing impacts on geological resources from periodic repairs of Scenic Drive, future widening of US 85, or energy development near the park. Minor impacts on air quality in the Juniper Campground area from vehicle emissions and noise from traffic would continue as visitors access the Temporary Visitor Center or temporary trailers near the park entrance (when they become operational), but these impacts would negligibly (not noticeably) contribute to the cumulative effect on visibility and noise of continuing energy development or proposed future reconstruction of US 85. Minor, short term adverse impacts on noise and air quality are expected during the demolition and restoration of the Abandoned Visitor Center site. Local and minor impacts (barely noticeable, localized effect on plant communities) from invasive non-native species would not substantially contribute to the cumulative impacts of past, present, or future impacts outside of the park. Ground disturbance (which facilitates invasive species incursion) within the park would be minor compared to planned activities outside the park and would not contribute to cumulative impacts. Future reconstruction of US 85 would result in traffic congestion in the area and would slightly increase the difficulty of accessing the park. Minor localized impacts on recreation would not contribute to cumulative impacts in the region.

In summary, other projects would not substantially contribute to cumulative impacts in the region.

3.6.2 Build Alternative 1

Localized, short-term, minor impacts (temporary and barely noticeably) on geologic resources through the disturbance of 1 acre (of which 0.2 acre would be impermeable surfaces) would not substantially contribute to cumulative impacts on geological resources. Impacts from other projects could include potential slumping of slopes or disturbance of soil from occasional repairs to Scenic Drive within the park, US 85

reconstruction and energy development. Build Alternative 1 would not affect projects outside of the park.

Construction of a new visitor center would intermittently affect visitor experience in the vicinity of the construction site through negligible impacts on air quality, visibility, noise, and traffic for up to one year (estimated) during construction. Any impacts from occasional repairs of Scenic Drive would also be local and short-term. Reconstruction of US 85 would likely affect visitor experience for one to two years. Impacts on visitor experience from deterioration of air quality and diminishment of panoramic vistas by changing the sense of solitude, inspiration, and timelessness from energy development are long-term trends. The impacts from construction of a new visitor center would not substantially contribute to any cumulative impacts on visitor experience from occasional repairs of Scenic Drive, widening of US 85, or energy development in the region. Air quality impacts from construction of the new visitor center would be negligible compared to widening US 85 and ongoing energy development, and thus represent a negligible contribution to cumulative air quality impacts.

The new visitor center would be constructed to blend into the existing environment to the extent possible and would not contribute to the cumulative impact in scenic vistas from widening US 85 or expanding energy development. Build Alternative 1 is approximately 1,000 feet west of US 85. If construction were to occur during the same timeframe, construction noise from both projects would affect an area between US 85 and the Build Alternative 1 site. The cumulative effect would be minor; noise perceived by visitors would intermittently increase several decibels above typical background levels but would return to previous levels once construction is complete. If the projects are constructed at different times, no cumulative effect would occur because of the temporary and intermittent nature of construction noise. Build Alternative 1 is located a minimum of 1,600 feet from park boundaries (as measured from a point along the Little Missouri River, to the southwest of the Build Alternative 1). In addition to increasing noise levels, energy development in the region has increased traffic congestion. Widening US 85 would temporarily increase congestion between Watford City and I-94 during construction but would decrease congestion in the long-term. Traffic impacts from constructing a new visitor center would be localized within the park and would not affect regional conditions.

Impacts from invasive non-native species would be localized and minor (barely noticeable, localized effect on plant communities) and would not contribute to cumulative effects from invasive non-native species outside of the Project area.

Widening of US 85 to four lanes would likely increase the volume of vehicular traffic passing by and through the park. The park is located on both sides of US 85, and any widening of US 85 would affect the park in terms of traffic, noise, and visitation. However, impacts on recreational resources from the Project would be minor and localized; consequently, no cumulative impacts are anticipated.

Build Alternative 1 would not contribute to significant cumulative impacts in consideration of the impacts projected to occur from the Project and those that would occur from ongoing and future reasonably foreseeable projects.

In summary, the North Unit Visitor Center project would not substantially contribute to cumulative impacts in the region.

3.6.3 Build Alternative 2

Build Alternative 2 would involve construction of a similar sized building as the other Build Alternatives but would likely require a new parking lot closer to the proposed building location. Demolition of the existing parking lot, as well as other improvements of a new site, would involve grading and ground disturbance (approximately 2 acres total, of which 0.4 acre would be impermeable surfaces) that would be more than Build Alternative 1, comparable to Build Alternative 3, and less than Build Alternative 4. Cumulative impacts would be comparable to those described for Build Alternative 1 and would be similar to those for Build Alternatives 3 and 4. The overall contribution of the Build Alternative 2 construction footprint to the regional development footprint would be negligible.

In summary, the North Unit Visitor Center project would not substantially contribute to cumulative impacts in the region.

3.6.4 Build Alternative 3

Build Alternative 3 would involve construction of a similar sized building as the other Build Alternatives but would likely require a new parking lot closer to the proposed building location and on the same side of Scenic Drive. Demolition of the existing parking lot, as well as other improvements of a new site, would involve grading and ground disturbance (approximately 2 acres total, of which 0.4 acre would be impermeable surfaces) that would be more than Build Alternative 1, comparable to Build Alternative 2, and less than Build Alternative 4. Cumulative impacts would be comparable to those described for Build Alternative 1 and would be similar to those for Build Alternatives 2 and 4. The overall contribution of the Build Alternative 3 construction footprint to the regional development footprint would be negligible.

In summary, the North Unit Visitor Center project would not substantially contribute to cumulative impacts in the region.

3.6.5 Build Alternative 4

Build Alternative 4 would involve construction of a similar sized building as the other Build Alternatives but would require a new parking lot and 300-foot access road off Scenic Drive. Partial demolition of the existing parking lot and modification of a portion of the lot as a visitor pullout adjacent to the park entrance and visitor information kiosk, as well as other improvements of a new site, would involve grading and ground disturbance (approximately 3 acres total, of which 0.5 acre would be impermeable surfaces) that would be more than any of the other Build Alternatives. Cumulative impacts would be comparable to those described for Build Alternative 1 and would be similar to those for Build Alternatives 2 and 3. The overall contribution of the Build Alternative 4 construction footprint to the regional development footprint would be negligible.

In summary, the North Unit Visitor Center project would not substantially contribute to cumulative impacts in the region.

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